SECTION 734-2.03(E) ELECTRICAL DEVICES: is modified to add:

(6) Global Positioning Satellites (GPS) Clock Assembly

General:

The GPS clock assembly shall consist of a programmable GPS interface device, GPS receiver, receiver to interface device harness and power-output harness. The assembly shall be designed to reset the clock time for 170, 2070 or NEMA type of traffic signal controllers using a time reference signal from GPS at least once a day. The interval for the controller clock resetting shall be programmable.

The supplier of the GPS clock shall provide detailed instructions on how the interface device is to reset the clock and how it is to be programmed to do so. These instructions shall include setup and maintenance information and a trouble shooting and error message guide. Part list, circuit diagrams and available service information shall also be included.

As a minimum each device shall come with a one year complete replacement warranty that assures the device shall function as herein specified and be free of any defect in design, material and workmanship. The manufacturer agrees to repair or replace within this time period any device found to be defective free-of-charge.

Physical Requirements:

The programmable GPS interface device shall be contained in a fully enclosed metal or plastic case and be suitable for wall mounting or setting on a shelf inside a traffic signal cabinet. As a minimum this device shall have a removable front/back cover, a liquid crystal display (LCD), programming-status switch(es), power-output port, and antenna input port. It can also have additional input/output port (e.g. RS-232) at the option of the manufacturer.

The receiver shall be a low profile (less than 2.5 inches high) fully enclosed rain-tight GPS antenna unit that shall be suitable for mounting on the exterior of a traffic signal cabinet via a single hole. The GPS antenna case shall be made of a long life exterior grade UV resistant plastic. The bottom of the receiver unit shall have a threaded opening with a short antenna connection cable. Attached to the bottom of the receiver unit shall be a short (2 inch minimum) threaded conduit, hub, or nipple mount. The antenna connect cable shall be long enough to project beyond the end of the mount. The receiver to interface device harness shall connect to the antenna connection cable via a quick disconnect pin type of connection. The threaded mount shall include a suitable gasket and locknut so a rain-tight and secure connection between the receiver unit and the traffic signal cabinet can be achieved.

The interface device to receiver and power harnesses shall be at least 4 feet long. The type of connectors provided shall be appropriate for their intended use; however as a minimum all connections shall be pre-wired threaded pin and sleeve type of connectors. Pre-wired means that all the harnesses shall be ready configured for a NEMA type controller unless specified otherwise.

The terminal block for the power supply and the low voltage output shall be a screw clamp type.

The main circuit board shall be screwed with screws so it is removable.

Electrical Requirements:

The interface device shall have an internal power supply. The power supply shall be configured so it can be plugged into a standard 115 volt AC outlet inside the controller cabinet via a three prong outlet (hot, neutral & bond). The power leads shall be internally fused with a 4 amp slow blow type of fuse.

The power supply shall be rated so it operates at 115 input voltage AC (+/- 20 volts) with a 12 output voltage DC (+/- 2 volt). All components shall be rated to operate within these parameters at a temperature range of between -30 degrees C to + 74 degrees C.

If the interface device's case is metal it shall be bonded.

The interface device shall have a single pole double throw relay that enables it to reset the controller clock when logic ground is applied via a selected pin in the NEMA D connector board. The rating of this relay should be at least 15 amps at 120 volts AC.

Functional Requirements:

The GPS interface device shall be designed to receive a time reference signal from GPS satellites via a time and interval to be programmed. Typically this will be set at a specified time and then be executed once the receiver locks on the required number of satellites. This time reference "pulse" is then processed and then made available to the traffic signal controller via a hard wire interface. For NEMA controller this shall be accomplished per a direct connection to the "D" plug panel that is pre-wired and attached to the power-output harness.

It is preferred that all programming of the time interval updates be accomplished internal to the interface device via a series of rotary or in-line switches and/or jumpers that are mounted and noted on the circuit broad. Other programming arrangement are available, but will be subject to evaluation and test prior to acceptance.

All programmed settings shall be easy to view either with markings on the circuit board and/or thru the LCD screen. This shall include: time zone selected, day or days of the week the clock will reset, and daylight saving times switch status.

The device shall have a power failure routine that enables the device to restore itself automatically to normal function after short or long interruptions. This includes maintaining the programmed settings and then also checking in on the last time it received a time reference and performing this function if necessary to catch up.

The device shall have a selectable time zone setting. Arizona is at Mountain Standard Time in the summer and Pacific Standard Time in the winter. It shall also have an automatic daylight savings time routine. However, it is important to note that Arizona does not use daylight savings time, so the daylight savings time feature must be able to be turned off.

The day or days of the week the device shall reset the controller clock shall be programmable. At a minimum the device shall have eight settings, 7 for each day of the week and then an every day of the week setting.

Method of Measurement:

Traffic Signal control cabinets and meter pedestal cabinets will be measured as a unit for each controller assembly or control cabinet furnished and installed.

Basis of Payment:

The accepted quantities of traffic signal control cabinets and meter pedestal cabinets, measured as provided above, will be paid for at the contract unit price each for the type of controller assembly or control cabinet designated in the bidding schedule, complete in place. Which shall be full compensation for the work described and specified herein and on the plans, including service terminal boxes, cabinet mounted service enclosures, meter sockets, breaker panels, foundations, conduit, elbows, anchor bolts, clearance pad, auxiliary signal controls, external logic modules and all other components necessary to provide a complete functional assembly for controlling the operation and timing of traffic control signals.